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The cognitive, affective and behavioural responses of self-oriented perfectionists following successive failure on a muscular endurance task

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Abstract

Recent research suggests that self-oriented perfectionism may be a positive dimension of perfectionism. However, Flett and Hewitt (2005, 2006) have argued that while this dimension may appear to have some desirable consequences, it renders those high in the disposition vulnerable to psychological and motivational difficulties when personal standards are not met. The present investigation sought to examine this assertion by comparing the cognitive, affective and behavioural responses of those reporting higher and lower self-oriented perfectionism after experiencing two successive failures on a muscular endurance task. Sixty-eight student-athletes (M age = 19.75 years, $SD = 1.25$ years) performed a series of cycling trials in which they failed to meet personal performance targets. Providing some support for Flett and Hewitt's assertions, findings indicated that following failure in the first trial, those higher in self-oriented perfectionism experienced a more pronounced increase in threat and reported withdrawing effort from the subsequent trial.

Keywords: motivation, achievement, sport

1 The cognitive, affective and behavioural responses of self-oriented perfectionists
2 following successive failure on a muscular endurance task

3 It is currently unclear whether perfectionism is an important and adaptive
4 characteristic of elite athletes, or a debilitating personality disposition that undermines
5 athletic development and psychological well-being. While there are currently a number of
6 conceptualisations of perfectionism, it is broadly defined as a combination of a
7 commitment to exceptionally high standards and a preoccupation with harsh self-critical
8 evaluation (see Stoeber & Otto, 2006). Because high standards are central to
9 perfectionism, some researchers have argued that perfectionism may be an essential
10 quality of elite performers that should be encouraged (e.g. Anshol & Eom, 2002; Dunn,
11 Causgrove Dunn, & Syrotuik, 2002; Hardy, Jones, & Gould, 1996). In contrast, others
12 have argued that because the definition of perfectionism is inclusive of harsh self-critical
13 evaluation it is likely to have few positive consequences for athletes (Flett & Hewitt,
14 2005; Greenspon, 2000; Hall, 2006). With few systematic empirical attempts to examine
15 the consequences of perfectionism for athletes (see Hall, 2006, for a review), it is difficult
16 to draw any firm conclusions regarding the nature and implications of the disposition.
17 However, given that perfectionism has been found to lead to debilitating, and at times
18 pathological, consequences in non-clinical samples (e.g., Cheng, 2001; Enns, Cox,
19 Sareen, & Freeman, 2001; Enns, Cox, & Clara, 2002), research is required to begin to
20 determine the implications of encouraging perfectionism in athletes.

21 One dimension of perfectionism that some have suggested may have a positive
22 impact is self-oriented perfectionism (Hewitt & Flett, 1991). This particular dimension is
23 characterised by an extreme desire to attain perfection and a tendency to respond to
24 substandard performance with self-criticism. The association between self-oriented
25 perfectionism and high personal standards has led some researchers to suggest that it may

1 be a component of adaptive achievement striving (e.g., Bieling, Israeli & Antony 2004;
2 Enns, Cox, & Clara, 2002; Frost, Heimberg, Holt, Mattia, & Neubauer, 1993; see also
3 Slade & Owens, 1998). However, other researchers have emphasised the association
4 between self-oriented perfectionism, self-criticism, fear of failure and a desire to validate
5 a positive sense of self as being equally as influential in determining its consequences. In
6 the opinion of these researchers, these psychological characteristics ultimately render the
7 disposition maladaptive (Flett, Besser, Davis, & Hewitt, 2003; Flett & Hewitt, 2005,
8 2006).

9 Within student samples, self-oriented perfectionism appears to be related to both
10 adaptive and maladaptive consequences. For example, it is associated with positive
11 aspects of coping (see Hewitt & Flett, 1996) and desirable achievement behaviour
12 (Bieling, Israeli, Smith & Antony, 2003; Mills & Blankstein, 2000), as well as more
13 negative consequences such as self-criticism, self-blame, and anxiety (e.g., Flett &
14 Hewitt, 1991; Thompson & Zuroff, 2004). To date, there has been relatively little
15 empirical examination of the consequences of self-oriented perfectionism in sport. Initial
16 field studies have, however, begun to find a similar pattern of findings amongst athletes
17 (e.g. Hall, Hill, & Appleton, 2009; Hill, Hall, Appleton, & Kozub, 2008). For example,
18 Hill and colleagues recently reported that self-oriented perfectionism appears to have the
19 potential to render junior elite athletes vulnerable to the experience of symptoms of
20 burnout. However, when athletes report satisfaction with progress towards personal
21 goals, it may provide resiliency against the syndrome and help maintain engagement..

22 One possible explanation for the mixed consequences of self-oriented
23 perfectionism is that it is believed to be a vulnerability factor (Flett & Hewitt, 2005,
24 2006). Specifically, it is thought that individuals high in this dimension of perfectionism
25 are predisposed to the experience of depression, anxiety and neuroticism through an

1 interaction with stress (Flett, Hewitt, Blankstein, & Mosher, 1995). This is because self-
2 oriented perfectionism is in part energised by a sense of conditional self-acceptance and a
3 fear of failure (Conroy, Kaye, & Fifer, 2007; Hill et al., 2008). Consequently, failure is
4 considered irrationally aversive (Ellis, 2002). While this possibility has yet to be
5 examined in a sport-related context, attempts to empirically verify the expected
6 interaction between self-oriented perfectionism and stress in non-clinical samples using
7 correlational designs have produced mixed findings. Some research has provided support
8 for the vulnerability hypothesis (Blankstein, Lumley, & Crawford, 2007; Flett, Hewitt,
9 Blankstein, Mosher, 1995; Hewitt et al., 2002), while the findings from other studies have
10 been equivocal (Chang & Rand, 2000; Enns, Cox, & Clara, 2005). Further, there has been
11 limited support for a proposed interaction between self-oriented perfectionism and
12 achievement stress (see Blankstein et al., 2007; Enns, et al., 2005; Hewitt et al., 2002;
13 Sherry, Hewitt, Flett & Harvey, 2003).

14 A small number of studies have examined the manner in which perfectionists
15 respond to achievement difficulties by manipulating failure, or providing negative
16 feedback indicative of possible failure, on simple mental (Besser, Flett, & Hewitt, 2004;
17 Besser, Flett, Hewitt, & Guez, 2008; Hewitt, Mittelstaedt, & Wollert, 1989; Frost,
18 Turcotte, Heimberg, Mattia, Holt & Hope, 1995; Stoeber, Harris, & Moon, 2007;
19 Stoeber, Kempe, & Keogh, 2008) and motor tasks (Anshel & Mansouri, 2005). In
20 contrast to the findings of research using correlational designs, the findings from these
21 studies largely corroborate Flett and Hewitt's (2006) claims. They suggest that the
22 potential for self-oriented perfectionism to lead to negative psychological and emotional
23 states may only be observable under conditions of achievement difficulty. Besser, Flett
24 and Hewitt (2004), for example, found that those higher in self-oriented perfectionism
25 responded to negative feedback on an achievement task with increased levels of anxiety,

1 hostility, and decreased positive affect. Similarly, Anshel and Mansouri (2005) found that
2 performance deteriorated in student-athletes with higher personal standards and concern
3 over mistakes following negative feedback. Consequently, there is some indication that
4 beyond the encouragement of reflective performance appraisal, failure may have negative
5 psychological, emotional and behavioural consequences for those higher in self-oriented
6 perfectionism.

7 A number of limitations may, however, prevent direct extrapolation from the
8 findings of these studies to sporting contexts characterised by personal and interpersonal
9 competition. First, one might question how well the simple mental and motor tasks used
10 within these studies generalise to competitive sport. This would appear particularly
11 important as a lack of correspondence between affective experience and successful versus
12 failed performance in previous studies indicates that such tasks may not be personally
13 salient (e.g., Anshel & Mansouri, 2005). Second, these studies have only examined the
14 response of self-oriented perfectionists to single failure experiences. It is possible that a
15 single failure may not be sufficient to evoke psychological difficulties because a history
16 of athletic or academic success has been proposed to provide resiliency against the
17 negative consequences of perfectionism (Blankstein & Winkworth, 2004). Moreover, a
18 pattern of increased effort following initial failure is typical for individuals who perceive
19 themselves to be competent and have little reason to seek strategies to protect ability
20 (Dweck & Leggett, 1988). Any attempt to examine the interaction between self-oriented
21 perfectionism and achievement difficulties for athletes must consider these issues.

22 Finally, examining the consequences of self-oriented perfectionism is complicated
23 further because it is positively related to dimensions of perfectionism that are consistently
24 associated with psychological difficulties (e.g., concern over mistakes, doubts about
25 action; Frost et al., 1993). In particular, self-oriented perfectionism is typically positively

1 correlated with socially prescribed perfectionism. This dimension of perfectionism is
2 characterised by the belief that the acceptance of significant others is contingent on the
3 attainment of externally imposed perfectionistic standards. Unlike self-oriented
4 perfectionism, socially prescribed perfectionism is invariably associated with
5 psychological maladjustment. Therefore, it is possible that the association between self-
6 oriented and socially prescribed perfectionism provides the basis for the psychological
7 difficulties associated with self-oriented perfectionism (see Flett & Hewitt, 2006 for a
8 discussion of this issue). While it may be a contentious issue to examine the
9 consequences of self-oriented perfectionism after partialing out variance shared with
10 socially prescribed perfectionism (see Chapman & Miller, 2001), accounting for the
11 relative contribution of socially prescribed perfectionism to any negative psychological
12 consequences would further our understanding of the mechanisms underlying the
13 proposed vulnerability associated with self-oriented perfectionism.

14 To begin to examine these mechanisms, the purpose of the current study was to
15 examine differences in cognitive, affective and behavioural responses between student-
16 athletes with higher and lower self-oriented perfectionism following the experience of
17 two successive failures on a muscular endurance task using a cycle ergometer. Consistent
18 with the assertions of Flett and Hewitt (2005, 2006), it was hypothesised that the
19 experience of failure would be characterised by a more extreme pattern of debilitating
20 cognition, affect and behaviour for athletes higher in self-oriented perfectionism.
21 Specifically, higher levels of perceived threat, negative affect, and thoughts of escape, as
22 well as lower levels of positive affect, satisfaction, effort and performance were
23 anticipated. In order to examine whether any significant findings could be attributed to
24 socially prescribed perfectionism, analyses were repeated controlling for levels of
25 socially prescribed perfectionism.

Method

Participants

Participants comprised 68 (48 males, 20 females) student-athletes recruited from a large university in the UK (M age = 19.75 years, SD = 1.25 years, range 18-24). The participants reported that they practiced their sports (hockey n = 35, football n = 14, rowing n = 6, rugby n = 6, swimming n = 2, taekwondo n = 1, tennis n = 1, athletics n = 1, lacrosse n = 1, netball n = 1) for 5.88 hours per week (SD = 3.69) and considered participation very important in comparison to other activities in their lives (M = 7.79, SD = .97; 1 = *Not at all Important* to 9 = *Extremely Important*). Participants were eligible for course credit as a result of their involvement.

Design

All participants engaged in a muscular endurance task using a cycle ergometer (LodeTM Examiner). This involved a goal setting exercise and the experience of two successive failures to attain personal performance targets. Subsequent analyses were based on a median-split of responses to the self-oriented perfectionism subscale of the Multidimensional Perfectionism Scale (Hewitt & Flett, 1991). To promote the self-oriented nature of the task, and reduce social evaluative threat, the intra-personal competitive nature of the task was emphasised throughout and all testing was conducted individually (see Besser et al., 2004).

Procedure

Prior to conducting the investigation, ethical approval was granted by the research ethics committees from the institution to which the authors were affiliated. Upon arrival at the laboratory, participants were requested to complete informed consent, a general health questionnaire, and Hewitt and Flett's (1991) Multidimensional Perfectionism Questionnaire. Providing the participants reported no cardiovascular, respiratory or

1 muscular problems, they then participated in a sub-maximal test to identify heart rate at
2 varying workloads and predict participants' maximal VO₂ workload (see American
3 College of Sports Medicine, 2006). Following the sub-maximal test, the participants were
4 requested to take part in three 6-minute intermittent time trials on a cycle ergometer set at
5 35% of their estimated VO₂ maximal level when at 60 revolutions per minute (RPM).

6 For the first of the 6-minute trials, participants were asked to perform under 'do
7 your best' conditions. Recorded instructions prior to this trial emphasised that at the end
8 of the trial they should be satisfied that this represented their best possible performance.
9 During the trial, the participants were provided with visual feedback of the distance
10 covered, current RPM, and time lapsed. Following their performance, participants had a
11 10 minute rest period. At the end of this period, participants were given a second set of
12 recorded instructions which requested them to set a personal goal for the next 6-minute
13 trial based on their previous performance. These instructions stated that they may wish to
14 strive to replicate their previous performance or improve it. Further, it was mentioned
15 that performance can typically be improved by up to 5%. The potential distances that
16 corresponded to performance increments were displayed on a computer screen. In
17 addition to the visual feedback provided in the previous trial, the selected personal target
18 was also displayed on screen during the subsequent trial. Following this goal setting
19 exercise, participants completed pre-trial measures of affect and cognitive appraisals.

20 Immediately prior to the second trial, further recorded instructions were given to
21 each participant. These instructions emphasised that success on the task would be
22 determined by the participants' cycling competence, physical endurance, effort and
23 pedalling technique. In addition, it was also stated that as the personal target was based
24 on the previous performance, it was likely to be attainable within the 6-minute trial.
25 During the 10 minute rest period following performance on this trial, participants

completed post-trial measures of affect and performance appraisals. The goal setting exercise and pre-trial and post-trial measures were then repeated for a third cycling trial.

To ensure that participants failed to meet their personal goals on the two trials, performance feedback was manipulated so that distances were electronically reduced as conveyed visually through the displayed distance travelled. Specifically, the displayed distance travelled on the two goal setting trials were reduced by 5% and 6% progressively through each trial. Pre-testing indicated that these reductions were sufficient to ensure failure and were subtle enough to make it most probable that the manipulation would be unnoticed. The slight increase in the degree to which performance was impeded in the final trial was to compensate for an increase in effort following failure on the first trial. Following completion of the study, all participants were debriefed regarding the aim of the investigation and the nature of the manipulation.

Instruments

Multidimensional Perfectionism: Self-oriented (SOP) and socially prescribed perfectionism (SPP) were assessed using Hewitt and Flett's (1991) Multidimensional Perfectionism Scale (HMPS). The two subscales of the MPS contain 15-items measured on a seven-point Likert scale (1 = *strongly disagree* to 7 = *strongly agree*). Responses on the self-oriented perfectionism subscale reflect a strong desire for perfection and intolerance of substandard performance (e.g. "I must always be successful in activities that are important to me." "I demand nothing less than perfection of myself."). In contrast, responses to the socially prescribed perfectionism subscale reflect the beliefs that significant others have exceedingly high standards and that acceptance is based on the attainment of those standards (e.g. "The people around me expect me to succeed at everything I do." "Others will like me even if I don't excel at everything." reversed). Previous research has provided evidence of the validity and reliability of the scale

(Hewitt & Flett, 1991). This includes acceptable levels of internal consistency ($\alpha = \text{SOP } .89$ and $\text{SPP } .86$) and test-retest reliability ($r = \text{SOP } .88$ and $\text{SPP } .75$; Hewitt & Flett, 1991). In the current study both SOP and SPP were considered to have acceptable levels of internal consistency ($\alpha = \text{SOP } .88$ and $\text{SPP } .74$).

Affective response: The affective responses of the participants were assessed using the Positive and Negative Affect Schedule (Watson, Clark & Tellegen, 1988). Responses on the positive affect subscale reflect high energy, concentration, and pleasurable engagement, while responses on the negative affect subscale are indicative of distress and unpleasurable engagement (Watson et al., 1988). Participants were asked to indicate the extent to which they felt the emotions listed at that particular moment (e.g. “Interested” “Enthusiastic” “Distressed” “Hostile”). Each response is measured on a five-point Likert scale (1 = *very slightly or not at all* to 5 = *extremely*). Previous research has provided evidence to support the validity and reliability of the scale (Watson et al., 1988). The two scales have also demonstrated acceptable internal consistency when used as state measures of affect ($\alpha = \text{PA } .89$ and $\text{NA } .85$; Watson et al., 1988). In the current study, both PA and NA were considered to have acceptable levels of internal consistency at each point of measurement ($\alpha = \text{PA } .88$.86 .85 and $\text{NA } .84$.88 .86).

Thoughts of escape: The Thoughts of Escape subscale of the Thought Occurrence Questionnaire for Sport scale (Hatzigeorgiadis & Biddle, 2000) was used to further assess the distress experienced by the participants during each trial. The scale requires participants to indicate the degree to which they experienced thoughts consistent with the desire to escape during the previous trial (e.g. “That I do not want to take part in this competition any more.” “That I cannot stand it any more.”). The subscale contains 6-items and is measured on a seven-point Likert scale (1 = *never* to 7 = *very often*). Previous research has provided evidence of the validity and reliability of the scale (α

=.90; Hatzigeorgiadis & Biddle, 2000). In the current study the scale was considered to have acceptable levels of internal consistency at both points of measurement ($\alpha = .93$ and $.96$).

Effort: Self-reported effort was assessed using the Effort-Importance subscale of the Intrinsic Motivation Inventory (McAuley, Duncan, & Tammen, 1989). The subscale required participants to indicate the amount of effort they invested in the performance on the previous trial (e.g. “I put a lot of effort into this.” “I didn’t try very hard to do well at this activity.” reversed). The subscale contains 5-items and is measured on a seven-point Likert scale (1 = *strongly disagree* to 7 = *strongly agree*). Research supports the validity and reliability of the scale ($\alpha = .84$; McAuley et al, 1989). In the current study, the scale was considered to have acceptable levels of internal consistency at both points of measurement ($\alpha = .76$ and $.92$).

Cognitive and performance appraisals: Two single items developed by Besser et al. (2004) were used to assess pre-trial and post-trial cognitive appraisals regarding personal performance. The pre-trial assessment measured perceived threat (“To what extent do you regard performing this task as threatening?”) and the post-trial assessment measured satisfaction with performance (“How satisfied are you with your performance?”). Responses were assessed on a seven-point Likert scale (1 = *not at all* to 7 = *very much*).

Objective performance: To assess objective performance, the distance travelled and average RPM in each trial were recorded.

Analytical strategy

The hypothesis that student-athletes higher in self-oriented perfectionism would experience greater levels of perceived threat, negative affect, and thoughts of escape, as well as lower levels of positive affect, satisfaction, effort and performance was examined

using a median-split to create two groups with higher and lower levels of self-oriented perfectionism and then conducting a series of repeated measures ANOVAs (Group x Time/Trial)¹. In each, the cognitive, affective and behavioural measures were used as dependent variables. Interaction terms (Group x Time/Trial) were given precedence over main effects (Pedhazur & Pedhazur-Schmelkin, 1991). As alluded to earlier, although the use of ANCOVA in quasi-experimental designs is controversial (see Chapman & Miller, 2001), in this instance such analyses provides a means of further understanding the origins of any negative consequences of self-oriented perfectionism. Consequently, a 2 x 2 (group by time/trial) repeated measures ANCOVA with socially prescribed perfectionism as a covariate was used in a strictly confirmatory manner to re-examine any significant findings. Because the sample size in the current study was relatively small, precise *p*-values and effect sizes are reported to aid interpretation of the effects (Kramer & Rosenthal, 1999). Partial η^2 provides an estimate of the proportion of total variance attributable to each individual main and interaction effect after controlling for other effects (Cohen, 1973). Cohen's (1988) guidelines for interpreting strength of association effect sizes were used to evaluate the effect size (small partial $\eta^2 = .01$, medium partial $\eta^2 = .09$, large partial $\eta^2 = .25$). Observed means for all analyses are displayed in Table 1.

Results

Manipulation check

Participants reported that the feedback they received was believable ($M = 5.70$, $SD = 1.39$). ("To what extent did you see the feedback you received as believable" Likert scale 1 = *not at all* to 7 = *very much*). Five participants reported below the mid-point on this item; however, in response to a follow-up open ended question asking them to explain their response, all indicated that they believed they had failed on both trials.

Establishing high and low self-oriented perfectionism groups

An independent t-test indicated that the median-split established two groups that differed significantly in reported self-oriented perfectionism ($M = 5.50$, $SD = 0.33$ versus $M = 4.31$, $SD = 0.51$): $t(56.17) = 11.41$, $p < .001$, partial $\eta^2 = .699$ (equal variances not assumed, Levene's test $F[1,66] = 14.01$, $p < .001$, variance ratio = 2.45). The two groups were screened for univariate outliers across the measured variables ($zscore > 3.29$) and one participant was removed from each group (see Tabachnick & Fidell, 2007). The two groups remained statistically different in terms of self-oriented perfectionism ($M = 5.51$, $SD = 0.32$ versus $M = 4.33$, $SD = 0.50$): $t(54.26) = 11.37$, $p < .001$, partial $\eta^2 = .704$ (equal variances not assumed, Levene's test $F[1,64] = 13.36$, $p = .001$, variance ratio = 2.47).

Differences between the two groups in terms of the goals set in the two trials were examined using a 2 x 2 (group by trial) repeated measures ANOVA. The selected percentage increase from performance in the initial trial was used as the dependent variable. There were no statistically significant main effects for group, $F(1, 64) = 0.71$, $p = .402$, partial $\eta^2 = .011$ (Levene's tests $F[1,64] = 1.11$, $p = .296$, and 9.31 , $p = .003$, variance ratios = 1.14 and 2.94), or interaction effect, $F(1, 64) = 0.32$, $p = .572$, partial $\eta^2 = .005$. There was a statistically significant main effect for time which was large in size that indicated that following the failure in trial one, both groups significantly reduced their goal for trial two, $F(1, 64) = 95.94$, $p < .001$, partial $\eta^2 = .600$. The absence of any difference between the two groups in terms of personal goals set in the two trials is surprising as one might expect the higher self-oriented perfectionism group to set higher goals than the lower self-oriented perfectionism group. In this instance, the median-split therefore did not capture any group differences in terms of goal setting. However, it was

group differences in cognitive and affective responses to goal difficulty and subsequent performance effects that were of primary interest in the present study.

Finally, the equivalency of the two groups in terms of the degree of failure they experienced in the two trials was examined using a 2 x 2 (group by trial) repeated measures ANOVA. Participants' personal target (metres) minus the reported distance travelled (metres) in each trial was used as the dependent variable. There was no statistically significant main effect for group, $F(1, 64) = 1.06, p = .306$, partial $\eta^2 = .016$ (Levene's tests $F[1,64] = 0.47, p = .497$, and $1.81, p = .184$, largest variance ratio = 1.65), or interaction effect, $F(1, 64) = 1.58, p = .214$, partial $\eta^2 = .024$. There was a statistically significant main effect for time that indicated that both groups fell short of their personal target in the second trial by a greater degree than in the first trial, $F(1, 64) = 7.21, p = .009$, partial $\eta^2 = .101$.

Collectively, these analyses support the existence of two groups that are distinguishable in terms of their reported self-oriented perfectionism but experienced the same degree of objective failure in the two trials.

Analysis of potential confounding variables

The equivalency of the two groups across gender, sport, age, and socially prescribed perfectionism was also assessed. A chi-square test indicated that the proportion of males and females in the higher and lower self-oriented perfectionism groups were the same, $\chi^2(1) = 0.00, p = 1.00$ (males $n = 23$ and females $n = 10$ in each group). Similarly, distribution of sport type across the two groups was the same, $\chi^2(9) = 6.20, p = .720$. Three independent samples t-tests indicated that the two groups did not significantly differ in terms of age ($M = 19.70, SD = 1.21$ versus $M = 19.79, SD = 1.34$), $t(64) = 0.29, p = .774$, partial $\eta^2 = .000$ (equal variances assumed, Levene's test $F[1,64] = 1.43, p = .236$, variance ratio = 1.22), years spent participating in their sport ($M = 8.12,$

$SD = 3.66$ versus $M = 9.41$, $SD = 3.80$), $t(64) = 1.40$, $p = .166$, partial $\eta^2 = .030$ (equal variances assumed, Levene's test $F[1,64] = 0.02$, $p = .904$, variance ratio = 1.08), and hours spent practicing their sport ($M = 6.73$, $SD = 3.95$ versus $M = 5.06$, $SD = 3.39$), $t(62.56) = 1.84$, $p = .071$, partial $\eta^2 = .051$ (equal variances not assumed, Levene's test $F[1,64] = 6.23$, $p = .015$, variance ratio = 1.36). However, as expected, the higher self-oriented perfectionism group reported significantly higher socially prescribed perfectionism ($M = 3.68$, $SD = 0.58$ versus $M = 3.37$, $SD = 0.47$), $t(64) = 2.36$, $p = .021$, partial $\eta^2 = .080$ (equal variances assumed, Levene's test $F[1,64] = 0.26$, $p = .615$, variance ratio = 1.54). It is therefore possible that any differences between the higher and lower self-oriented perfectionism group in terms of cognitive, affective and behaviour responses to the successive failures may be attributed to level of socially prescribed perfectionism. This possibility was examined in supplementary analyses.

Differences between higher and lower self-oriented perfectionism groups in terms of cognitive, affective and behavioural response to successive failure¹

Negative and positive affect before and after performance in each trial

A 2 x 3 (group by time) repeated measures MANOVA examined whether the higher and lower self-oriented perfectionism groups differed in a linear combination of reported negative and positive affect measured across pre-trial one, pre-trial two, and post-trial two. This indicated that the multivariate main effect for group, Wilks' $\Lambda = .928$, $F(2, 63) = 2.44$, $p = .095$, partial $\eta^2 = .072$, and the interaction effect, Wilks' $\Lambda = .960$, $F(4, 61) = 0.64$, $p = .634$, partial $\eta^2 = .040$, were not statistically significant. However, the multivariate main effect for time was statistically significant, Wilks' $\Lambda = .524$, $F(4, 61) = 13.84$, $p < .001$, partial $\eta^2 = .476$. These effects were examined further using univariate analyses.

Negative affect before and after performance in each trial

A 2 x 3 (group by time) repeated measures ANOVA examined whether the higher and lower self-oriented perfectionism groups differed in reported negative affect measured pre-trial one, pre-trial two, and post-trial two. The main effect for group fell marginally outside of statistical significance, $F(1, 64) = 3.73, p = .058$, partial $\eta^2 = .055$ (Levene's tests $F[1, 64] = 2.57, p = .114, 2.57, p = .114$, and $0.70, p = .407$, variance ratios = 1.57, 1.75, and 1.18). The interaction effect was not statistically significant, $F(1.81, 116.01) = 0.39, p = .657$, partial $\eta^2 = .006$ (sphericity not assumed, $\chi^2 [2] = 6.87, p = .032$, therefore df were corrected using Greenhouse-Geisser estimate of sphericity $\epsilon = .91$). However, the main effect for time was statistically significant and medium in size, $F(1.81, 116.01) = 5.56, p = .006$, partial $\eta^2 = .080$. Contrasts indicated that negative affect increased linearly over time, $F(1, 64) = 6.89, p = .011$, partial $\eta^2 = .097$. This was considered to represent a medium effect size.

Positive affect before and after performance in each trial

A second 2 x 3 (group by time) repeated measures ANOVA was used to examine whether the higher and lower self-oriented perfectionism groups differed in reported positive affect measured pre-trial one, pre-trial two, and post-trial two. The main effect for group was not statistically significant, $F(1, 64) = 1.07, p = .304$, partial $\eta^2 = .016$ (Levene's tests $F[1, 64] = 1.22, p = .273, 0.02, p = .894$, and $0.14, p = .712$, variance ratios = 1.23, 1.09, and 1.01). The interaction effect was not statistically significant, $F(2, 128) = 0.15, p = .406$, partial $\eta^2 = .014$ (sphericity assumed, $\chi^2 [2] = 2.51, p = .286$). The main effect for time was statistically significant and was large in size, $F(2, 128) = 25.49, p < .001$, partial $\eta^2 = .285$. Contrasts indicated that positive affect decreased linearly over time, $F(1, 64) = 40.37, p < .001$, partial $\eta^2 = .387$. This was considered to represent an extremely large effect size.

Threat, escape, effort, and satisfaction in response to performance in each trial

A 2 x 2 (group by time) repeated measures MANOVA examined whether the higher and lower self-oriented perfectionism groups differed in a linear combination of reported threat, escape, effort, and satisfaction associated with performance in both trials. This indicated that the multivariate main effect for group was not statistically significant, Wilks' $\Lambda = .874$, $F(4, 61) = 2.20$, $p = .079$, partial $\eta^2 = .126$. However, the multivariate main effect for time, Wilks' $\Lambda = .827$, $F(4, 61) = 3.19$, $p = .019$, partial $\eta^2 = .173$, and interaction effect, Wilks' $\Lambda = .759$, $F(4, 61) = 4.85$, $p = .002$, partial $\eta^2 = .241$, were statistically significant. These effects were examined further using univariate analyses.

Perceived threat before performance in each trial

A 2 x 2 (group by time) repeated measures ANOVA was used to examine whether the higher and lower self-oriented perfectionism groups differed in perceived threat pre-trial one and pre-trial two. The main effect for both group, $F(1, 64) = 5.85$, $p = .018$, partial $\eta^2 = .084$ (Levene's tests $F[1, 64] = 2.64$, $p = .109$, and 8.50 , $p = .005$, variance ratios = 2.01 and 2.76), and time, $F(1, 64) = 8.32$, $p = .005$, partial $\eta^2 = .115$, were statistically significant and were medium in size. These effects were superseded by a statistically significant interaction effect that was medium in size, $F(1, 64) = 5.87$, $p = .018$, partial $\eta^2 = .084$. The interaction is displayed in Figure 1 and illustrates that, while the pre-trial one perceived threat level was similar for both groups, following failure on the first trial the higher self-oriented perfectionism group experienced a more pronounced increase. Simple effects analysis examining changes in threat within each group across trials indicated that the threat reported by the higher self-oriented perfectionism group significantly increased from pre-trial one to pre-trial two, $F(1, 64) = 14.08$, $p < .001$, partial $\eta^2 = .180$, whereas no significant change was observed for the lower SOP group, $F(1, 64) = 0.11$, $p = .745$, partial $\eta^2 = .001$. Examination of differences between groups within each trial indicated that the two groups did not significantly differ in perceived

1 threat prior to trial one, $F(1, 64) = 1.66, p = .203$, partial $\eta^2 = .025$, however the higher
 2 self-oriented perfectionism group reported significantly greater threat than the lower self-
 3 oriented perfectionism group prior to trial two, $F(1, 64) = 9.29, p = .003$, partial $\eta^2 =$
 4 .107.

5 *Thoughts of escape experienced during each trial*

6 A 2 x 2 (group by time) repeated measures ANOVA was used to examine whether
 7 the higher and lower self-oriented perfectionism groups differed in thoughts of escape
 8 during each trial (measured post-trial one and post-trial two). No statistically significant
 9 main effect for group, $F(1, 64) = 0.45, p = .506$, partial $\eta^2 = .007$ (Levene's tests $F[1, 64]$
 10 $= 13.66, p < .001$, and $2.43, p = .124$, variance ratios = 2.33 and 1.40), time, $F(1, 64) =$
 11 $3.31, p = .074$, partial $\eta^2 = .049$, or interaction effect, $F(1, 64) = 0.91, p = .764$, partial η^2
 12 $= .001$, was observed.

13 *Reported effort in each trial*

14 A 2 x 2 (group by time) repeated measures ANOVA was used to examine
 15 whether the higher and lower self-oriented perfectionism groups differed in reported
 16 effort in each trial (measured post-trial one and post-trial two). The main effect for group
 17 was not statistically significant, $F(1, 64) = .142, p = .708$, partial $\eta^2 = .002$ (Levene's
 18 tests $F[1, 64] = 0.66, p = .419$, and $23.91, p < .001$, variance ratios = 1.42 and 3.67).
 19 There was a significant main effect for time that was small-to-medium in size, $F(1, 64) =$
 20 $4.09, p = .047$, partial $\eta^2 = .060$. However, this effect was superseded by a statistically
 21 significant interaction effect that was medium in size, $F(1, 64) = 6.87, p = .011$, partial η^2
 22 $= .097$. The interaction is displayed in Figure 2 and illustrates that, while the reported
 23 effort of the lower self-oriented perfectionism group remained similar in the two trials,
 24 the reported effort of the higher self-oriented perfectionism group decreased sharply from
 25 trial one to trial two. Simple effects analysis examining within group changes in effort

across trials indicated that the decrease in reported effort for the higher self-oriented perfectionism group was significant, $F(1, 64) = 10.78, p = .002$, partial $\eta^2 = .144$. In contrast, there was no significant change in reported effort for the lower self-oriented perfectionism group, $F(1, 64) = 0.18, p = .673$, partial $\eta^2 = .003$. Examination of between group differences within each trial indicated that the two groups did not significantly differ in reported effort following trial one, $F(1, 64) = 1.32, p = .255$, partial $\eta^2 = .020$, or following trial two, $F(1, 64) = 1.61, p = .208$, partial $\eta^2 = .024$.

Satisfaction with performance in each trial

A 2 x 2 (group by time) repeated measures ANOVA was used to examine whether the higher and lower self-oriented perfectionism groups differed in satisfaction with performance in each trial (measured post-trial one and post-trial two). There was no statistically significant effect for group, $F(1, 64) = 1.82, p = .182$, partial $\eta^2 = .028$ (Levene's tests $F[1, 64] = 3.81, p = .055$, and $2.44, p = .123$, variance ratios = 1.76 and 1.55), and time, $F(1, 64) = 0.03, p = .876$, partial $\eta^2 = .000$. There was a statistically significant interaction effect that was small-to-medium in size, $F(1, 64) = 4.42, p = .039$, partial $\eta^2 = .065$. The interaction is displayed in Figure 3 and illustrates that, in comparison to the lower self-oriented perfectionism group, the higher self-oriented perfectionism group reported higher levels of satisfaction with performance in trial one. However, similar levels of satisfaction with performance in trial two were reported by both groups as satisfaction decreased for the higher self-oriented perfectionism group and increased for the lower self-oriented perfectionism group. Simple effects analysis examining within group changes in satisfaction across trials indicated that, despite some change in both groups, the levels of satisfaction did not change significantly for trial one and two for either the higher self-oriented perfectionism group, $F(1, 64) = 2.55, p = .115$, partial $\eta^2 = .038$, or the lower self-oriented perfectionism group, $F(1, 64) = 1.89, p =$

.174, partial $\eta^2 = .028$. Examination of between group differences within each trial indicated that the two groups differed significantly in satisfaction with performance in trial one, $F(1, 64) = 4.87, p = .031$, partial $\eta^2 = .071$, but did not differ significantly in satisfaction with performance in trial two, $F(1, 64) = 0.02, p = .879$, partial $\eta^2 = .000$.

Performance in trial one and two

A 2 x 2 (group by trial) repeated measures MANOVA examined whether the higher and lower self-oriented perfectionism groups differed in a linear combination of distance travelled and average RPM in trial one and trial two. This indicated that the multivariate main effect for group, Wilks' $\Lambda = .978, F(2, 63) = 0.72, p = .490$, partial $\eta^2 = .022$, and the interaction effect, Wilks' $\Lambda = .963, F(2, 63) = 1.20, p = .308$, partial $\eta^2 = .037$, were not statistically significant. However, the multivariate main effect for time was statistically significant, Wilks' $\Lambda = .693, F(2, 63) = 13.96, p < .001$, partial $\eta^2 = .307$. These effects were examined further using univariate analyses.

Distance travelled in trial one and two

A 2 x 2 (group by trial) repeated measures ANOVA was conducted to examine differences in the distance travelled between the higher and lower self-oriented perfectionism groups in the two trials. There was no statistically significant effect for group, $F(1, 64) = 0.01, p = .941$, partial $\eta^2 = .000$ (Levene's tests $F[1, 64] = 1.31, p = .258$, and $0.17, p = .682$, variance ratios = 1.68 and 1.38), or interaction effect, $F(1, 64) = 1.35, p = .250$, partial $\eta^2 = .021$. There was a statistically significant effect for trial that was large in size, $F(1, 64) = 28.21, p < .001$, partial $\eta^2 = .306$, indicating that both groups travelled further in trial one than in trial two.

Average RPM in trial one and two

A 2 x 2 (group by trial) repeated measures ANOVA was conducted to examine differences in the average RPM between the higher and lower self-oriented perfectionism

groups in the two trials. There was no statistically significant main effect for group, $F(1, 64) = 0.74, p = .394$, partial $\eta^2 = .011$ (Levene's tests $F[1, 64] = 2.32, p = .133$, and $0.46, p = .499$, variance ratios = 1.69 and 1.12), and interaction effect, $F(1, 64) = 2.41, p = .126$, partial $\eta^2 = .036$. There was a statistically significant main effect for time that was large in size, $F(1, 64) = 16.87, p < .001$, partial $\eta^2 = .209$, indicating greater average RPM in trial one than in trial two.

Re-examination of findings controlling for level of socially prescribed perfectionism

To test the possibility that the observed effects of self-oriented perfectionism on perceived threat, reported effort and satisfaction are attributable to differences in level of socially prescribed perfectionism, the analyses of these dependent variables were repeated using a 2 x 2 (group by time) repeated measures ANCOVA using level of socially prescribed perfectionism as a covariate². The interaction effect for perceived threat, $F(1, 64) = 5.30, p = .025$, partial $\eta^2 = .078$, and reported effort, $F(1, 64) = 6.31, p = .015$, partial $\eta^2 = .091$, remained statistically significant and medium in size. The interaction effect for satisfaction moved marginally outside of conventional statistical significance, $F(1, 64) = 3.24, p = .077$, partial $\eta^2 = .049$. Estimated means for these effects, adjusted for level of socially prescribed perfectionism, are displayed on Figures 1-3.

Discussion

Research suggests that as self-oriented perfectionism is strongly associated with a number of positive qualities, it may be best considered a component of adaptive achievement striving (e.g., Bieling, Israeli, & Antony, 2004; Frost et al., 1993). However, Flett and Hewitt (2005, 2006) have argued that while this dimension of perfectionism may appear to have some desirable motivational consequences, it renders those high in the disposition vulnerable to psychological and motivational difficulties when personal

standards are not met. In the present research, we tested this contention by examining the responses of student-athletes higher and lower in self-oriented perfectionism to two successive failures on a muscular endurance task. Consistent with the assertions of Flett and Hewitt (2005, 2006), it was hypothesised that the experience of failure would be characterised by a more extreme pattern of debilitating cognition, affect and behaviour for those higher in self-oriented perfectionism. That is, we expected student-athletes higher in self-oriented perfectionism to exhibit greater levels of threat, negative affect, and thoughts of escape, as well as lower levels of positive affect, satisfaction, effort and performance (distance travelled and average RPM) in comparison to student-athletes reporting lower self-oriented perfectionism. The possibility that these differences were attributable to differences in level of socially prescribed perfectionism was also examined.

No differences were found between those higher and lower in self-oriented perfectionism in terms of reported affect, thoughts of escape, and performance as a consequence of the two failures. However, the analyses did indicate that following failure in the first trial, those higher in self-oriented perfectionism experienced a more pronounced increase in threat, reported significantly greater reduction in effort from the subsequent trial, and a reported decrease in satisfaction. Moreover, the effects on threat and effort remained statistically significant when controlling for differences between the two groups in level of socially prescribed perfectionism. Although individuals higher and lower in self-oriented perfectionism did not exhibit a wide range of differences in their responses to successive failures, there is evidence within the current study that individuals higher in self-oriented perfectionism find failure, and the possibility of future failure, more aversive than those who are lower in this personality characteristic. These

1 findings are, therefore, broadly consistent with the assertions of Flett and Hewitt (2005,
2 2006).

3 The increase in reported threat following initial failure corroborates previous
4 research which has found that personal failure is associated with greater levels of distress
5 (e.g., hostility, shame, rumination, decreased positive affect) for those higher in
6 perfectionism (e.g. Besser et al., 2004, 2008; Frost, Trepanier et al., 1997; Frost,
7 Turcotte, et al., 1995; Stoeber, et al., 2008). The aversion to personal failure exhibited by
8 individuals with higher self-oriented perfectionism may reflect the belief that acceptance
9 is conditional on achievement (Greenspon, 2000). For this reason, achievement striving
10 and personal performance outcomes may carry irrational personal importance (Besser, et
11 al., 2004; Hewitt et al, 1989), and failure in meaningful activities may be perceived to
12 have a number of negative consequences that include shame and embarrassment (Conroy
13 et al., 2007; Flett, Blankstein, Hewitt & Koledin, 1992). The findings from the current
14 investigation suggest that the negative consequences of personal failure may be
15 considered so salient by those higher in self-oriented perfectionism that a single failure,
16 and the possibility of future failure, is enough to evoke elevated levels of anticipatory
17 threat.

18 This increase in perceived threat was accompanied by a reported decrease in
19 effort on the second trial. It is noteworthy, however, that there was no difference in the
20 indicators of objective effort (distance travelled and average RPM) across the trials above
21 that observed in the other group. This suggests the possibility that, rather than indicating
22 behavioural reduction in effort, the reported reduction in effort may be a self-protective
23 strategy. A number of theoretical models suggest that when achievement carries irrational
24 personal importance, individuals will utilise various defensive strategies and self-serving
25 biases to protect themselves from negative self-perceptions (see Covington, 2000;

Crocker & Park, 2003). This is because when achievement striving is regulated in part by a fear of failure, a tension can arise between the need to exert effort in order to attain high personal standards and the possibility that by exerting effort failure may be attributed to low ability (Thompson, 1993). Support for this explanation is provided by field studies revealing individuals higher in self-oriented perfectionism to be more likely to attribute failure in achievement scenarios to a lack of effort (Blankstein & Winkworth, 2004; Flett, Hewitt, Blankstein, & Pickering, 1998; Spiers Neumeister, 2004). There is also evidence that suggests individuals higher in self-oriented perfectionism may use self-handicapping behaviours when they perceive a lack of control over successful outcomes (Hobden & Pliner, 1995) or experience failure (Doebler, Schnick, Beck, & Astor-Stetson, 2000). Consequently, the current study extends previous research by indicating that individuals higher in self-oriented perfectionism may utilise protective cognitive responses or self-serving attributions in order to avoid perceptions of incompetence.

There were also differences between the higher and lower self-oriented perfectionism group in terms of satisfaction with performance. In comparison to the lower self-oriented perfectionism group, the higher self-oriented perfectionism group reported significantly higher levels of satisfaction with performance in trial one. This difference was no longer present for trial two because, relative to the initial reported satisfaction reported for performance in trial one, the higher self-oriented perfectionism demonstrated a trend towards reporting less satisfaction in trial two whereas the lower self-oriented perfectionism demonstrated a trend towards reporting an increase in satisfaction in trial two. The pattern of these differences was not strictly what was expected. Self-oriented perfectionism is purported to be associated with difficulty deriving a sense of satisfaction from performance because of the degree of goal rigidity they exhibit and an increased sensitivity to discrepancies between performance and

1 personal standards (Besser et al., 2004). It may be that those with higher levels of self-
2 oriented perfectionism are able to gain a sense of satisfaction from their efforts but this is
3 fleeting in the continued absence of objective success. Because research examining the
4 relationship between self-oriented perfectionism and satisfaction has produced mixed
5 findings (e.g., Hill et al., 2009; Mor et al., 1995), further research is required before this
6 findings can be more clearly understood.

7 The cognitive, affective and behavioural response to failure observed in the
8 current investigation was limited to perceived threat, reported effort and satisfaction.
9 Why no other differences between the groups were observed is unclear. It may be that the
10 achievement task was not sufficiently meaningful to evoke substantial differences
11 between the two groups. However, the increase in perceived threat reported by the higher
12 group suggests that this is unlikely to be the case. An alternative explanation is that the
13 impact of personal failure on some of the individuals higher in self-oriented
14 perfectionism was attenuated by third-order variables not assessed in the current
15 investigation. Flett and Hewitt (2005) have argued that a number of situational variables
16 (e.g., perceived competence, perceived task difficulty, nature of evaluative threat, task
17 focus) may be influential in determining the consequences of self-oriented perfectionism.
18 The current findings indicate that self-serving attributions may be used by those higher in
19 self-oriented perfectionism to protect against perceptions of incompetence. It is likely that
20 other psychological mechanisms can also offset the experience of failure. A further
21 possibility is that the consequences of personal failure extend beyond the cognitive,
22 affective and behavioural measures that were assessed. For example, the experience of
23 guilt, shame and anger, may be more important affective outcomes than generic affect
24 when those higher in self-oriented perfectionism contend with personal failure (see
25 Stoeber et al., 2008). Future research should examine these possibilities.

Limitations and other future directions

The findings should be considered in context of the limitations of the current investigation. Notably, because there are currently no objective criteria for identification of high levels of self-oriented perfectionism, it is difficult to identify when levels of self-oriented perfectionism are likely to be especially problematic and whether the levels reported by the higher group in the current study would be classified as such. Consequently, the comparisons made in the current investigation are limited to the relative levels of self-oriented perfectionism in the sample. This is particularly important because in the current study the median-split did not result in differences between the two groups in terms of the personal goals set in the two trials. The current investigation also used single items to measure threat and satisfaction associated with performance. While the use of single-item measures have a number of benefits (e.g., simplicity, brevity), their reliability and validity are not easily established. Therefore, findings that involve these variables should be considered especially tentative. The use of multiple ANOVAs without controlling for an increased probability of an experimentwise error may also be problematic. In the current study, because of the relatively small sample size, such a correction was considered to be overly stringent and more likely to increase the probability of missing genuine effects (Wright, 1992). We therefore emphasise the size of the observed effects and have reported exact *p*-values to aid interpretation of the findings in light of this limitation (Kramer & Rosenthal, 1999). Finally, future research should examine whether the findings generalise beyond the sample and context in the current study. It is not yet known, for example, whether perfectionism holds similar meaning, and has similar consequences, in different cultural contexts. Research outside of sport has begun to accrue that suggests that there may be some cultural differences in terms of levels of perfectionism and its consequences (e.g., Castro, & Rice, 2003; Chang, 1998;

Gilman, Ashby, Sverko, Florell, & Varjas, 2005); however, research has yet to examine this possibility in athlete samples.

Conclusion

The findings of the current study are broadly consistent with the notion that self-oriented perfectionism may represent a vulnerability factor for athletes (Flett & Hewitt, 2005, 2006), at least in terms of threat appraisal. Personal failure, or the possibility of future personal failure, appears to be a potential source of distress for those higher in this dimension of perfectionism even after controlling for levels of socially-prescribed perfectionism. This is assumed to be due to the belief that failure holds a number of negative consequences for self-appraisal (Conroy et al., 2007; Flett, Besser et al., 2004). In the current investigation, attempts to avoid these consequences manifested in the reported reduction in effort from the achievement task and increased threat appraisals. As has been stated elsewhere, although the pursuit of perfectionistic standards may have the potential to contribute to positive motivational consequences, when attainment is believed to be a necessity for a sense of self-acceptance, individuals are likely to find failure especially threatening (Lundh, 2004). It is this belief that is likely to underpin any association between self-oriented perfectionism and negative motivational and psychological consequences in a competitive sport setting.

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Footnotes

¹ Preliminary analysis indicated that some of the variables were not normally distributed in each group. However, because ANOVA is generally considered robust when (i) groups are equal group size, (ii) there are 20 degrees of freedom for error and (iii) non-normality is not caused by the presence of outliers (Tabachnick & Fidell, 2007), we proceeded with the intended analyses. In some instances homogeneity of variances was also not supported. In all cases, however, variance ratios were below four. Because the group

1 sizes were equal and variance ratios are below four, the degrees of heterogeneity of
2 variances were considered unproblematic (Myers & Well, 2003).

3 ² Prior to conducting these analyses the additional assumptions of ANCOVA were
4 examined (linear relationship between dependent variables and covariates, homogeneity
5 of regression slopes, reliable measurement of covariate). Correlations between socially
6 prescribed perfectionism (covariate) and the dependent variables were small for both

7 threat ($r = .27, p < .05$, and $r = .23, p = .065$) and satisfaction ($r = -.08, p = .527$ and $r = -$
8 $.242, p = .051$) and nominal for effort ($r = .07, p = .561$, and $r = -.09, p = .480$). The

9 homogeneity of regression slopes (independent variable x Covariate interaction)

10 assumption was checked for each ANCOVA. None of the interactions between self-

11 oriented perfectionism group and socially prescribed perfectionism were statistically

12 significant indicating that the regression slopes for each group are similar. In other words,

13 the effect of self-oriented perfectionism on the dependent variables was not dependent on

14 the level of socially prescribed perfectionism. Finally, the measurement of the covariate

15 was considered sufficiently reliable ($\alpha = .74$).

Table 1. Observed descriptive statistics for measures of cognitive, behavioural and performance appraisals following performance.

| | | Pre-trial 1 | | Post-trial 1/Pre-trial 2 | | Post-trial 2 | |
|------------|----------------------|-------------|------|--------------------------|--------|--------------|--------|
| | | Mean | SD | Mean | SD | Mean | SD |
| Higher SOP | Positive affect | 2.98 | 0.65 | 2.61 | 0.59 | 2.56 | 0.62 |
| | Negative affect | 1.77 | 0.55 | 1.96 | 0.76 | 1.91 | 0.74 |
| | Perceived threat | 2.58 | 1.44 | 3.27 | 1.66 | -- | -- |
| | Satisfaction | -- | -- | 4.09 | 1.70 | 3.68 | 1.67 |
| | Reported effort | -- | -- | 5.87 | 0.84 | 5.33 | 1.56 |
| | Thoughts of escape | -- | -- | 3.04 | 1.60 | 3.29 | 1.89 |
| | Distance covered (m) | -- | -- | 2938.45 | 318.92 | 2788.39 | 295.17 |
| | Average RPM | -- | -- | 84.66 | 8.92 | 81.04 | 8.08 |
| Lower SOP | Positive affect | 2.89 | 0.58 | 2.54 | 0.62 | 2.34 | 0.63 |
| | Negative affect | 1.50 | 0.43 | 1.64 | 0.57 | 1.69 | 0.68 |
| | Perceived threat | 2.18 | 1.01 | 2.24 | 1.00 | -- | -- |
| | Satisfaction | -- | -- | 3.27 | 1.28 | 3.63 | 1.34 |

| | | | | | | |
|----------------------|----|----|---------|--------|---------|--------|
| Reported effort | -- | -- | 5.65 | 0.70 | 5.72 | 0.82 |
| Thoughts of escape | -- | -- | 2.75 | 1.05 | 3.11 | 1.60 |
| Distance covered (m) | -- | -- | 2916.39 | 246.32 | 2820.14 | 251.26 |
| Average RPM | -- | -- | 85.25 | 6.86 | 83.61 | 7.65 |

Figure 1. The interaction between time and level of self-oriented perfectionism predicting perceived threat associated with upcoming performance. Note: Estimated means are adjusted for covariate socially prescribed perfectionism.

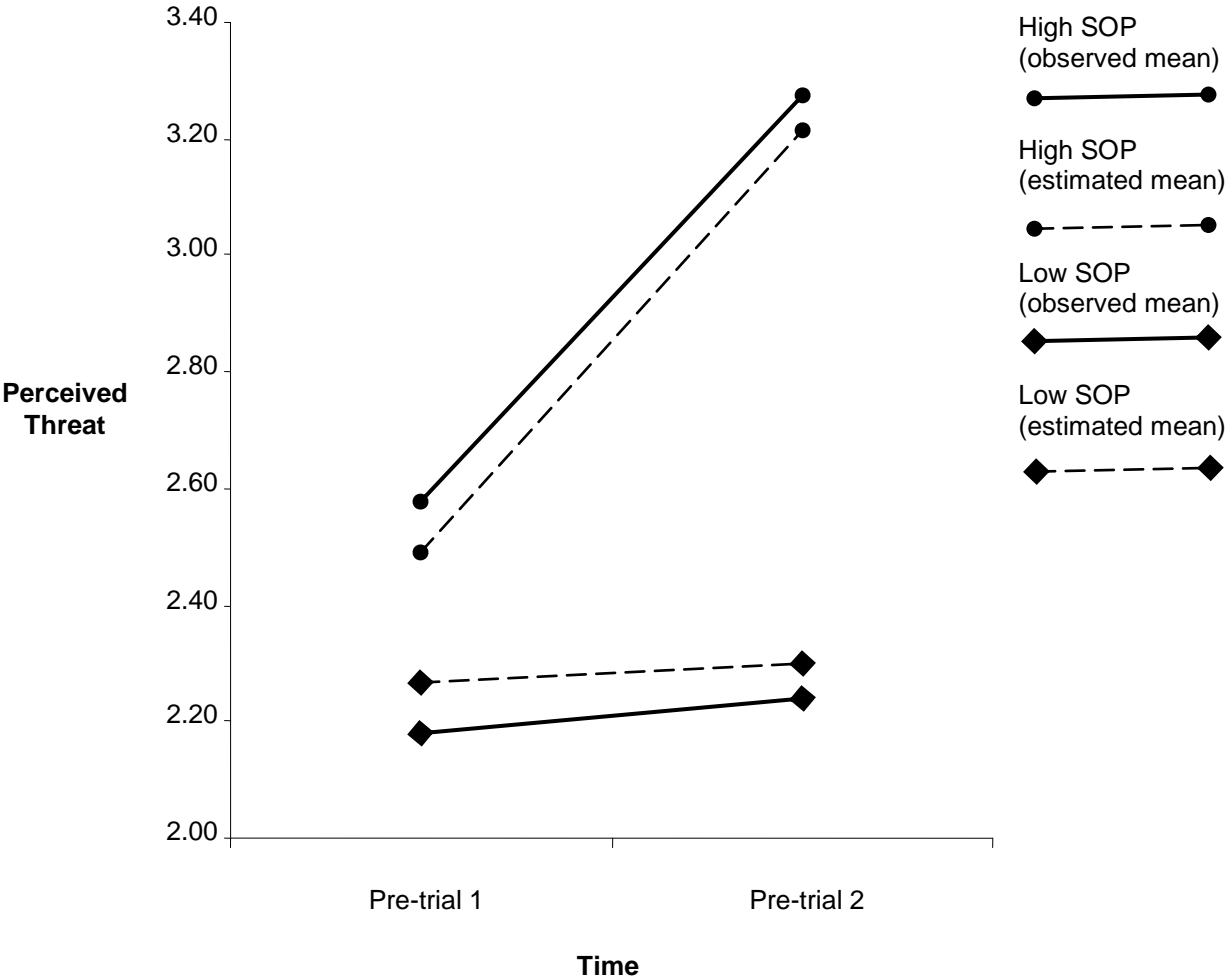


Figure 2. The interaction between time and level of self-oriented perfectionism predicting level of reported effort during the two trials. Note: Estimated means are adjusted for covariate socially prescribed perfectionism.

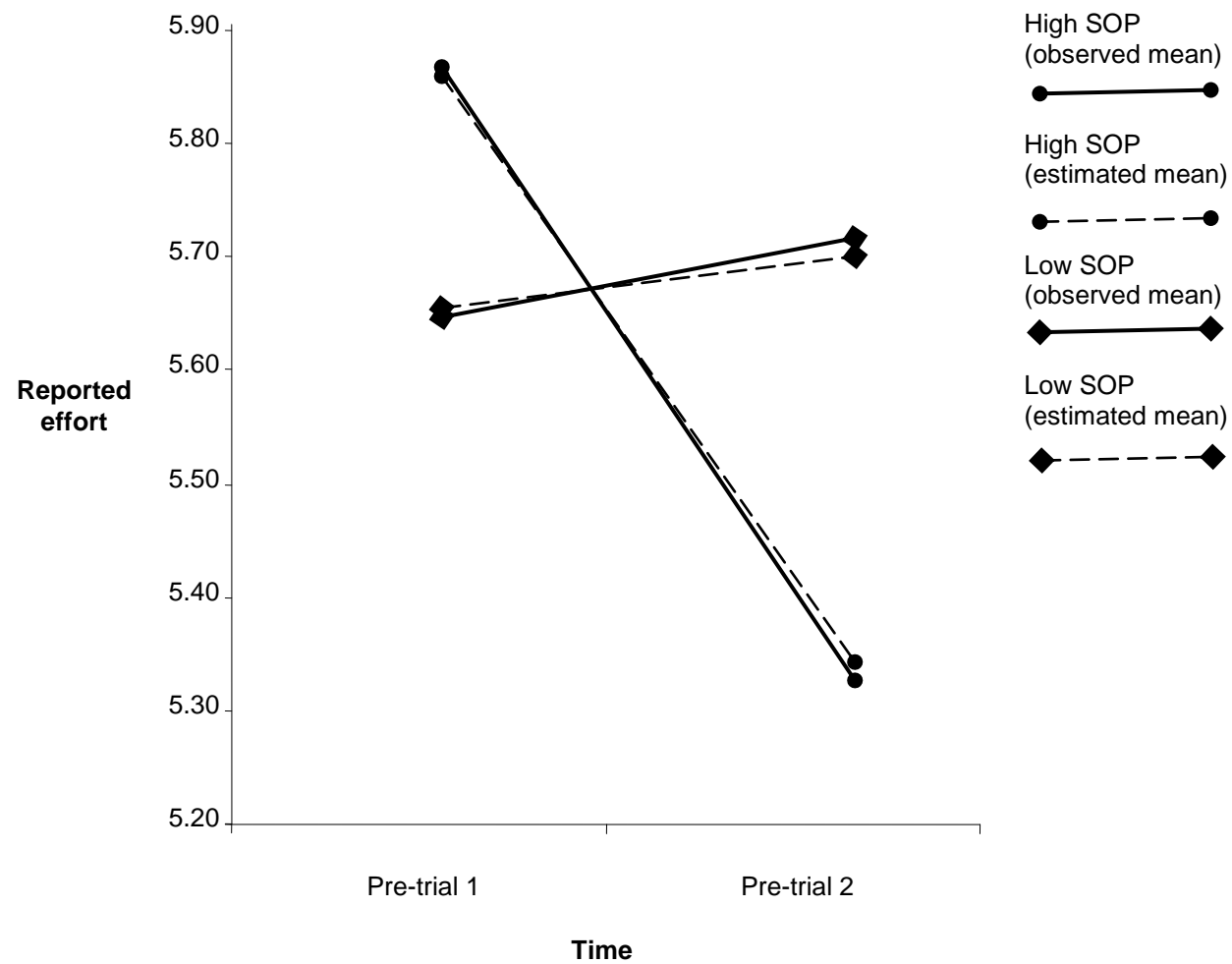


Figure 3. The interaction between time and level of self-oriented perfectionism predicting level of satisfaction with performance. Note: Estimated means are adjusted for covariate socially prescribed perfectionism.

